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(54) A method and arrangement for cleaning guide rollers.

(57) The invention relates to an arrangement and a method for removing printing ink from guide rollers (11) in a printing press.

As a paper web (2) moves along its normal path through the printing press while printing is suspended, a printing-ink solvent (6), preferably a mineral-oil fraction, is sprayed onto the paper web, either upstream or downstream of a printing machine (1). The printing-ink deposits on the rollers (11) are dissolved by the solvent as the sprayed paper-web (2) passes over the rollers (11), and the dissolved printing ink is then wiped from the rollers with a non-sprayed part of the paper web (2).

In accordance with one preferred embodiment, the solvent (6) is sprayed onto the paper web (2) in one or more sinusoidal paths and the guide rollers (11) are subsequently braked, preferably to a complete stop and preferably pulse-wise when the sprayed part of the web and the wiping part of the web (2) passes over the rollers. The duration of the pulses is preferably variable and adapted to the cleaning effect desired.

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A METHOD AND ARRANGEMENT FOR CLEANING GUIDE ROLLERS

The present invention relates to a method and an arrangement for cleaning the guide rollers of printing presses.

In conventional printing presses, the web of printing paper passes from a feed roller, through the printing machine in which the paper is printed on one or both sides thereof, and thereafter, when printing is completed, over one or more guide rollers to a paper-folding mechanism where the printed paper web is cut and folded. The guide rollers are either freely rotating or motor-driven for rotation. Several tens of such rollers may be provided for guiding each paper web between the printing machine and the folding mechanism.

These guide rollers are dirtied successively with printing ink from the paper print. Consequently, it is necessary to remove these ink deposits regularly from the guide rollers, so as to prevent pleating or scrinkling of the paper web and the transfer of ink deposits onto said web. Various methods for cleaning such guide rollers manually are known to the art. For instance, subsequent to removing the paper web, the guide rollers can be scraped free of such deposits, either with or without the aid of a cleansing agent. This cleansing method is both laborious and highly time consuming, and also very expensive.

Several methods of removing printing ink from printing rollers mechanically are also known to the art. Examples of such methods are found in US 4 058 059, US 4 344 361, EP 0 257 818, SE 455 396, SE 417 298, US 3 120 805 and US 2 731 916. In principle, the methods taught by these publications involve applying a movable cleaning device to a dirty printing roller. Printing-ink solvent is transferred from the cleaning device to the printing roller, either by spraying or by brushing with the aid of brushes. The solubilized printing-ink is wiped from the roller with a cloth or with paper provided in roll-form on the cleaning device, or is scraped-off with brushes or knives on said device. The aforedescribed methods, however, are suitable only for cleaning printing rollers. A cleaning unit of the aforedescribed kind is much too bulky and expensive for use in cleaning relatively small and relatively many guide rollers. Furthermore, in the majority of cases, the use of such a cleaning unit requires, the paper web to be removed from the guide rollers.

The invention provides, instead, a method and an arrangement for cleaning guide rollers which circumvents the aforesaid problem and with the aid of which guide rollers can be cleaned much more quickly, more positively, and more effectively than with prior known methods and arrangements, without needing to remove the paper web.

The invention will now be described in more detail with reference to non-limiting, exemplifying embodiments thereof and with reference to Figs. 1-4 of the accompanying drawings.

Fig. 1 illustrates schematically the construction of a printing press and shows the path travelled by the paper web between different units incorporated in the press.

Fig. 2 illustrates in perspective possible positioning of guide rollers in a printing press.

Fig. 3 is a longitudinal, sectional view of a spray device forming part of the invention, and shows the device facing towards the paper web.

Fig. 4 illustrates schematically the configuration of a narrow paper web sprayed in accordance with a first embodiment of the invention described herebelow.

Fig. 5 illustrates schematically the configuration of a broad paper web sprayed in accordance with the first embodiment described herebelow.

A paper web 2 is advanced from the printing machine 1 past a spray device 3 which is equipped with one or more nozzles, of which only two 4,5 are shown, and which is operative to spray a cleansing agent 6 onto the paper web 2. To this end, the spray device may alternatively be positioned adjacent a part of the paper web 2 located before the printing machine 1. The cleaning agent 6 consists of a substance which will not weaken the paper web 2, and may, for instance, consist of a mineral-oil fraction which constitutes a solvent for a number of printing inks. When the paper web 2 has a narrow width, the cleaning device operates with solely one nozzle 4, 5. When the web has a wide width, the cleaning device operates with several nozzles 4,5.

The nozzles 4,5 are fixedly mounted on a piston rod 8. In operation, the nozzles 4,5 will be held constantly at a mutual distance apart. An advantage is afforded, however, when nozzle spacing can be changed when spraying is not being carried out. When the spraying device is operational, the nozzles 4,5 can either have fixed positions in relation to the spraying device 3, or can be moved forwards and backwards, either intermittently or continuously along substantially the whole length of the spray device 3 in different ways, with the aid of the piston rod 8.

In the case of a first and preferred embodiment, the paper web 2 is sprayed along a length thereof adapted to the respective cylindrical surfaces of the downstream guide rollers, to the number of said rollers present and to the extent to which the rollers are soiled. Spraying is effected

while the piston rod 8 moves the nozzles 4,5, continuously backwards and forwards along the spraying device 3. The sprayed regions of the paper web 2 will therefore have a sinusoidal configuration as indicated at 9 and 10.

When the sprayed portion of the paper web 2 reaches the guide rollers 11, the rollers are successively braked pulsewise, so that the tangential speed of the rollers will differ from the speed of the paper web 2 during application of the braking pulses. The best effect is achieved when the rotational speed of the rollers 11 is braked so that the rollers 11 are brought pulsewise to a complete standstill. The aforesaid pulses are preferably of variable duration adapted to the desired cleaning effect. Alternatively, or complementary hereto, the guide rollers 11 can be displaced forwards and backwards continuously while in contact with the sprayed part of the web 2, in a direction perpendicular to the direction of movement of the web 2. In this case, the cleaning agent 6 is transferred to the rollers 11 by virtue of the sinusoidal configuration of the sprayed regions, in a manner such that a part of the ink on the rollers 11 moistened by the cleanin agent or solvent 6 will be wiped-off, almost immediately, by a non-moistened part of said web. This enables printing ink on the guide rollers 11 to be moistened and wiped-off in one single step and with the least possible paper consumption.

In accordance with another embodiment, the paper web 2 is, instead, sprayed with the nozzles 4,5 placed in fixed positions relative to the spray device 3, wherewith the paper web 2 is saturated with cleaning agent 6 substantially across the whole width of said web. In this case, the guide rollers 11 are first moistened with cleaning agent 6 and are then wiped clean by a following non-sprayed part of the web 2 in a separate step.

When the web 2 has passed through all of the guide rollers 11 present, the consequently soiled paper is scrapped and printing is recommenced with no time wastage.

Braking of the guide rollers 11, preferably so that the rollers are brought to a complete stop, is controlled in the case of the first embodiment preferably in a pulse-wise fashion and only when the guide rollers 11 are in contact with sprayed paper 2, and in the case of the second embodiment also during subsequent wiping of the rollers with non-sprayed parts of the web 2, and such that at most the number of guide rollers 11 braked simultaneously, preferably to a complete stop, will not exceed the number at which the paper web 2 will rupture.

The invention has been described in the aforegoing with reference to the cleaning of guide rollers in printing presses. It will be obvious, however, that the method can also be applied for cleaning other devices which come into contact with a moving web of paper, cloth, fibres and the like, and that modifications can be made within the scope of the inventive concept.

Claims

1. A method for cleaning guide rollers (11) forming part of a printing press having a printing machine (1) and including a web of printing paper (2), **characterized** in that the paper web (2) is moved along its normal printing path without being printed upon in the printing machine (1); in that subsequent to having passed the printing machine (1), the paper web is passed through a spray device (3) comprising one or more nozzles (4,5) by means of which a given length of the paper web (2) is sprayed, intermittently or continuously, on one or both sides thereof with a printing-ink solvent solution (6), for instance a mineral-oil fraction; in that the paper web is then passed over one or more guide rolelrs (11), wherein the solvent (6) is transferred to the rollers such as to dissolve printing ink deposited thereon, said ink being wiped from the rolelrs (11) by unsprayed parts of the paper web (2); in that the part of the paper web (2) wetted with solvent and soiled with printing ink is scrapped; and in that printing of the untouched part of the paper web (2) is then commenced without change to the paper web (2).

2. A method for cleaning guide rollers (11) according to Claim 1, **characterized** in that the length of paper web (2) sprayed with said agent is controlled manually or automatically in dependence on the number of guide rollers (11) present and the total area of their cylindrical surfaces and also in dependence on the extent to which said rollers are soiled.

3. A method for cleaning guide rollers (11) in accor dance with Claims 1-2, **characterized** in that when the paper web (2) is passed over the guide rollers (11) for the purpose of depositing solvent (6) on said rollers (11) or for wiping printing-ink therefrom, said rollers are braked, preferably pulse-wise, such as to obtain a tangential speed which differs from the speed of the paper web (2), said tangential speed preferably being zero; and in that said pulses are of variable duration and adapted to the cleaning effect desired.

4. A method for cleaning guide rollers (11) in accordance with Claims 1-2, **characterized** in that when the paper web (2) is passed over the guide rollers (11) with the intention of depositing solvent (6) on said rollers (11) or for wiping printing ink therefrom, the guide rollers are moved continuously forwards and backwards in the same plane as the paper web (2) and in a direction perpendicular to

the movement direction of the paper web (2), while the tangential speed of the guide rollers (11) is equal to or deviates pulse-wise from the speed of the paper web (2) and said tangential speed is therewith preferably zero; and in that said pulses are of variable duration and adapted to the cleaning effect desired.

5. A method for cleaning guide rollers (11) in accordance with Claim 3 or 4, **characterized** by controlling the braking force automatically, preferably such that the guide rollers (11) are brought to a total stop, and so that the number of rollers (11) which are braked simultaneously, preferably to a total stop, will not be such as to cause the paper web (2) to rupture.

6. A method for cleaning guide rollers (11) in accor dance with any one of the preceding claims, **characterized** in that while spraying the paper web (2) one or more of the nozzles (4,5) is or are moved continuously forwards and backwards along substantially the whole length of the spray device (3), wherewith solvent (6) is deposited on the web (2) in a more or less sinusoidal path, whereafter saturation of the guide rollers (11) with solvent (6) and wiping of dissolved printing ink from the guide rollers (11) takes place simultaneously and in a sequence resulting in the least possible consumption of paper web (2) for cleaning of the guide rollers (11).

7. An arrangement for cleaning guide rollers (11) incorporated in a printing press including a printing machine (1) and a web of printing paper (2), **characterized** in that the arrangement includes a spray device (3) provided with one or more nozzles (4,5) which function to spray a given length of paper web (2) with a printing-ink solvent (6), either intermittently or continuously, preferably in a manner such as to spray said parts of the paper web (2) in a pre-determined configuration, for instance a sinusoidal configuration.

8. An arrangement for cleaning guide rollers (11) in accordance with Claim 7, **characterized** in that the nozzles (4,5) are mounted on a piston rod (8) which may either be stationary in relation to the spray device (3) or arranged for movement forwards and backwards along substantially the whole length of said spray device (3); and in that during a spraying operation the nozzles (4,5) are spaced constantly apart, and in that the nozzle spacing can be changed when spraying does not take place.

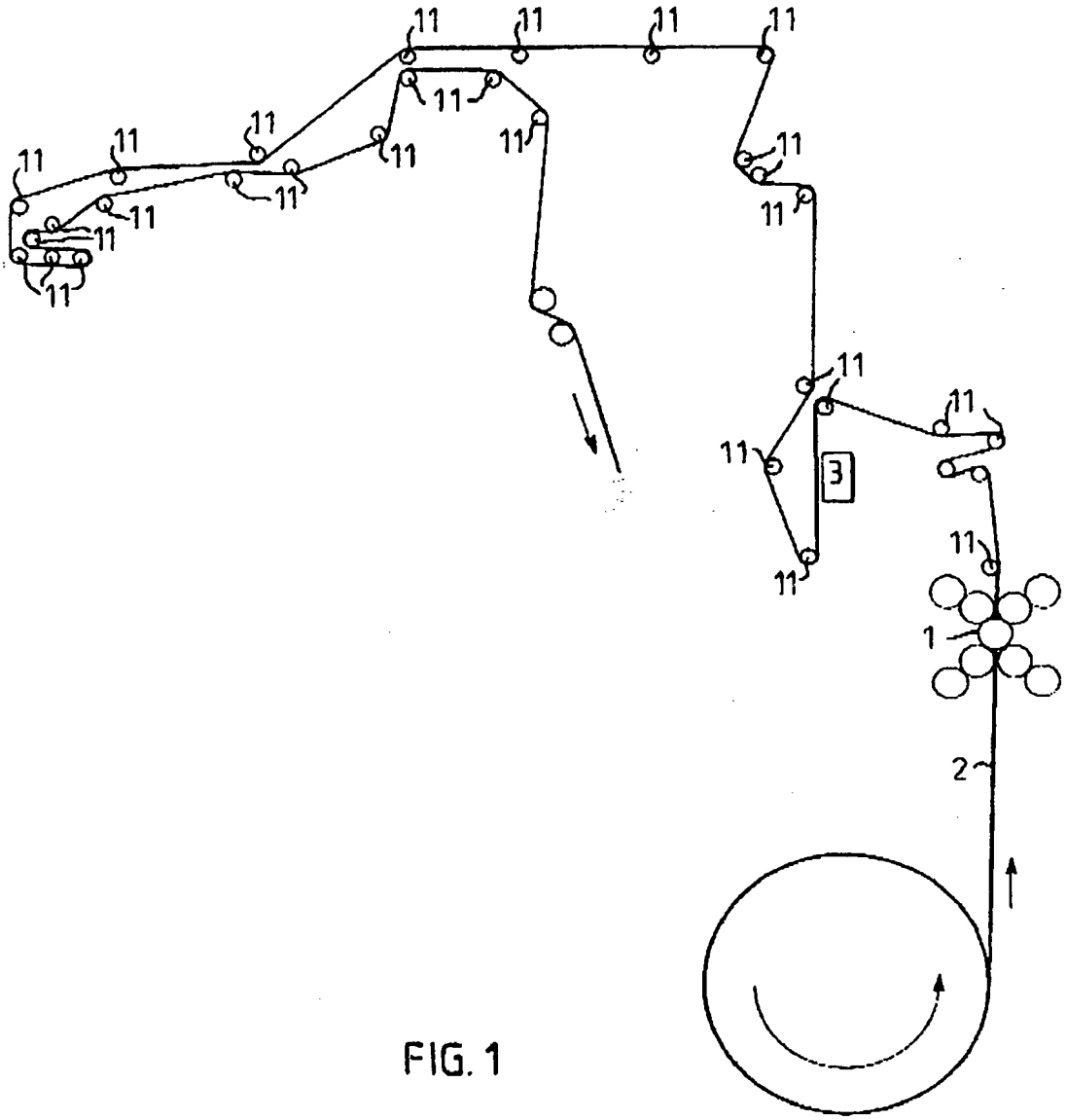

FIG. 1

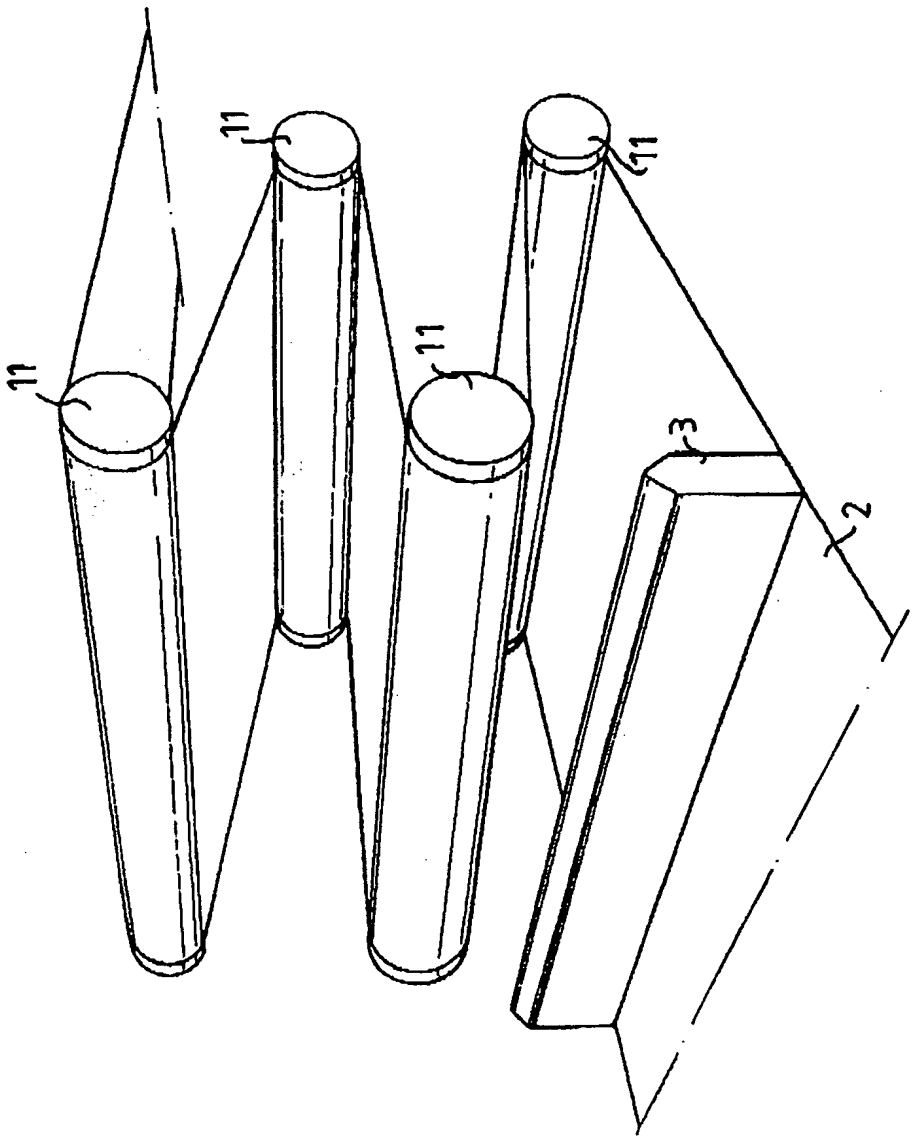

FIG.2

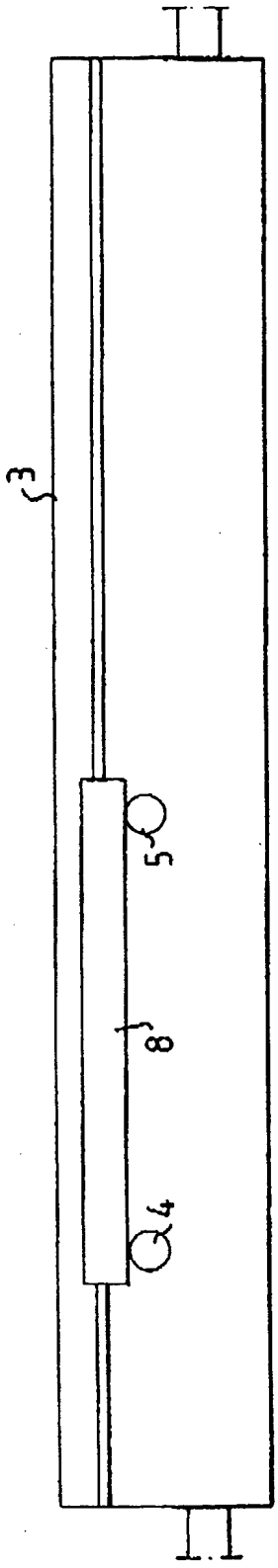

FIG.3

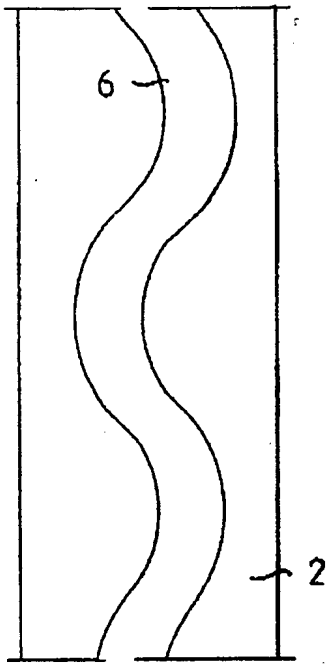

FIG. 4

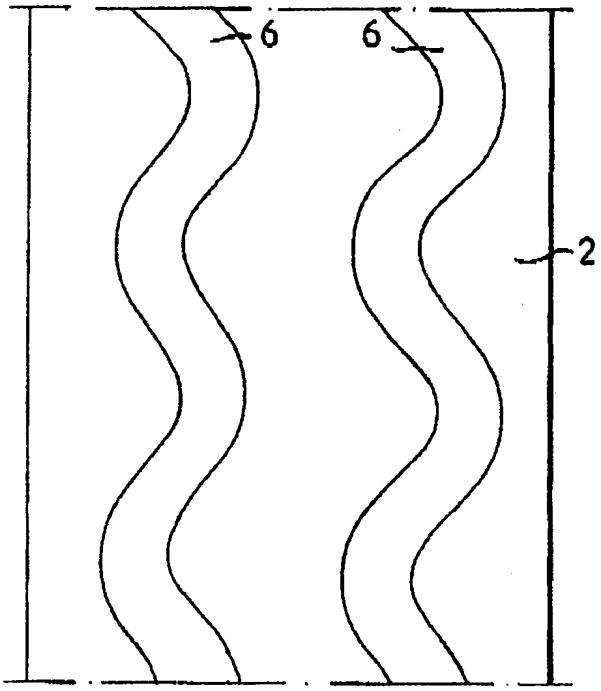

FIG. 5